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Prepared in cooperation with the U.S. Geological Survey

GEOLOGIC MAP OF THE SAN CLEMENTE 7.5' QUADRANGLE ORANGE AND SAN DIEGO COUNTIES, CALIFORNIA: A DIGITAL DATABASE

VERSION 1.0

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Digital Database
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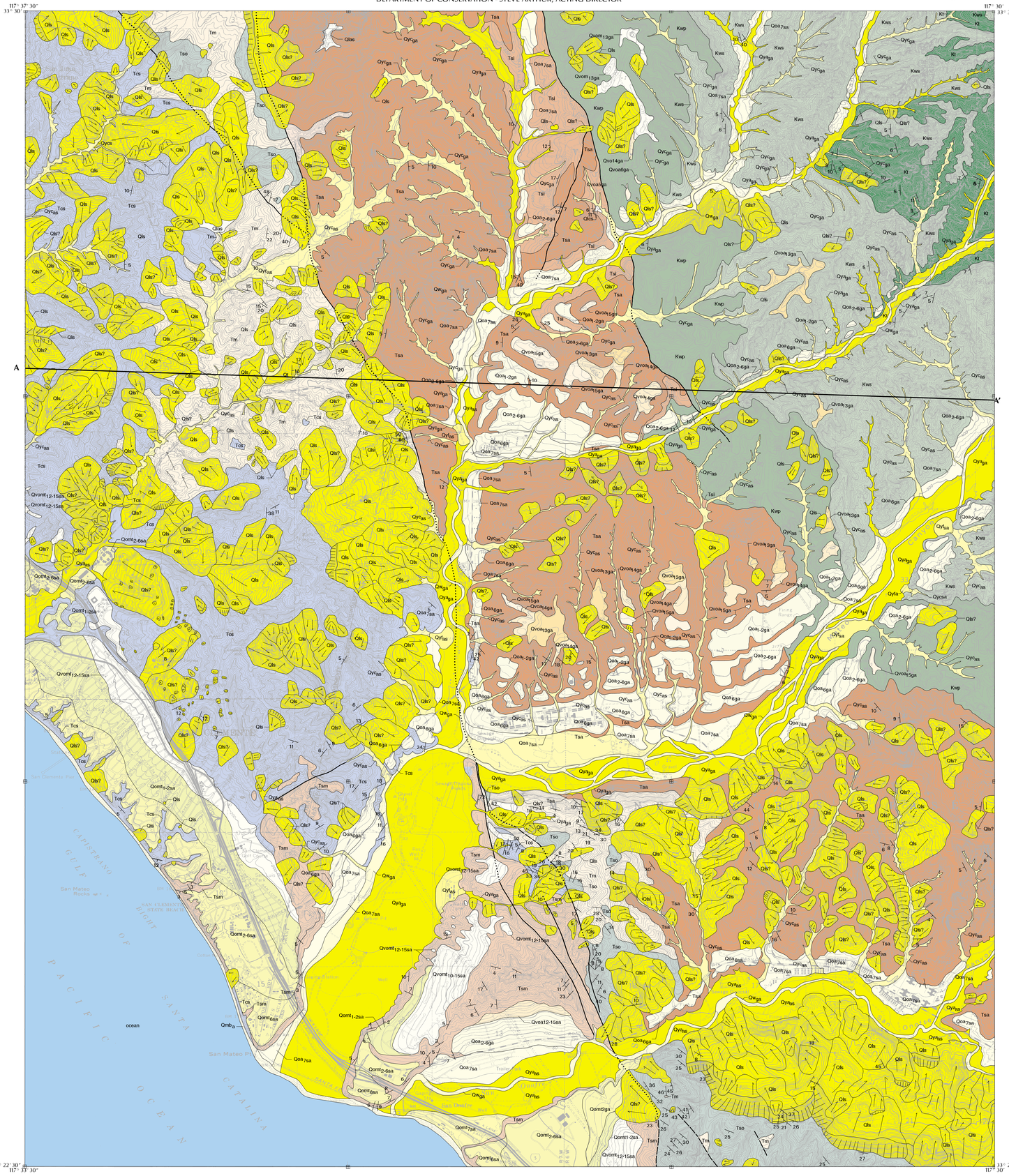
1999

1. California Division of Mines and Geology, Los Angeles, CA
2. U. S. Geological Survey, Riverside, CA



CORRELATION OF MAP UNITS

Qwg a	Qmb a	Qla s			Holocene
Qya s,ga		Qyf s,ga	Qyf sa		
Qls					
Qomt 7sa	Qoa 7sa,ga				Pleistocene
Qomt 6sa	Qoa 6ga				
Qomt 2-6sa	Qoa 2-6ga				
Qomt 1-2 sa,ga	Qoa 1-2ga				
	Qvoa 15ga				
Qvomt 12-15 sa,ga	Qvoa 14ga				
	Qvoa 13ga				
Tsm					Miocene
Tcs					
Tm					
Tso					
Tsv					Pliocene
Tsa					Eocene
Tsi					Paleocene
Kwp					Cretaceous
Kws					
Kt					

QUATERNARY

TERTIARY

CRETACEOUS

MAP SYMBOLS

- Contact between map units.
- Fault - solid where accurately located. Dashed where approximately located or inferred. Dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.
- Strike and dip of inclined sedimentary beds.
- Landslide - arrows indicate principal direction of movement; head scarp area is indicated by hachures. Landslides were mapped from pre-graded (natural) conditions; some slides may have been subsequently altered by mitigation and stabilization activites. Querried where questionable.
- Geologic cross-section.

DESCRIPTION OF MAP UNITS

Qwga — Active channel and wash deposits; unconsolidated sediments; ga = gravelly sand with silt.

Qmba — Active marine beach deposits; unconsolidated sediments; a = sand with some gravel.

Qlas — Active lake deposits; submerged sediments; as = sandy silt with clay.

Qya s,ga — Younger (Holocene, not active) alluvial flood plain deposit; unconsolidated sediments; as = sandy silt with clay; ga = gravelly sand with clay and silt.

Qyc as,ga — Younger (Holocene, not active) colluvial (slope wash) and stream deposits along small drainage courses; as = sandy silt with some gravel and clay; ga = gravelly sand with clay and silt.

Qyf sa — Younger (Holocene, not active) alluvial fan deposits; sa = silty sand with gravel and clay.

Qls — Landslide deposit; landslid; broken-up and weathered material, subject to renewed slope failures. Querried where existence is questionable.

Qomt 7sa — Older (Pleistocene, younger than 500,000 years) marine and non-marine terrace deposits above marine wave-cut platform; moderately consolidated sediments. Age of platform is estimated to be 80,000 years (7 = Bird Rock Terrace); sa = silty sand with clay and gravel.

Qoa 7sa,ga — Older (Pleistocene, younger than 500,000 years) alluvial river deposit; moderately consolidated sediments. Age of the river-cut platform is estimated to be 80,000 years (7 = Bird Rock Terrace); sa = silty sand with clay; ga = gravelly sand with clay and silt.

Qomt 6sa — Older (Pleistocene, younger than 500,000 years) marine and non-marine terrace deposits above marine wave-cut platform; moderately consolidated sediments. Age of platform is estimated to be 120,000 years (6 = Nestor Terrace); sa = silty sand with clay and gravel.

Qoa 6ga — Older (Pleistocene, younger than 500,000 years) alluvial river deposit; moderately consolidated sediments. Age of river-cut platform is estimated to be 120,000 years (6 = Nestor Terrace); sa = gravelly sand with clay and silt.

Qomt 2-6sa — Older (Pleistocene, younger than 500,000 years) marine and non-marine terrace deposits above marine wave-cut platform; moderately consolidated sediments. Age of platform is estimated between 120,000 (6 = Nestor Terrace) and 413,000 years (2 = Parry Grove Terrace); sa = silty sand with clay and gravel.

Qoa 2-6ga — Older (Pleistocene, younger than 500,000 years) alluvial river deposit; moderately consolidated sediments. Age of river-cut platform is estimated between 120,000 (6 = Nestor Terrace) and 413,000 years (2 = Parry Grove Terrace); ga = gravelly sand with clay and silt.

Qomt 1-2 sa,ga — Older (Pleistocene, younger than 500,000 years) marine and non-marine terrace deposits above marine wave-cut platform; moderately consolidated sediments. Age of platform is estimated between 413,000 (2 = Parry Grove Terrace) and 450,000 (1 = Golf Course Terrace); sa = silty sand with clay and gravel; ga = gravelly sand with clay and silt.

Qoa 1-2ga — Older (Pleistocene, younger than 500,000 years) alluvial river deposit; moderately consolidated sediments. Age of river-cut platform is estimated between 413,000 (2 = Parry Grove Terrace) and 450,000 (1 = Golf Course Terrace); ga = gravelly sand with clay and silt.

Qvoa 15ga — Very old (Pleistocene, older than 500,000 years) alluvial river deposit; moderately consolidated sediments. Age of river-cut platform is estimated to be 510,000 years (15 = San Elijo Terrace); ga = gravelly sand with clay and silt.

Qvoa 14ga — Very old (Pleistocene, older than 500,000 years) alluvial river deposit; moderately consolidated sediments. Age of river-cut platform is estimated to be 630,000 years (14 = Fire Mountain Terrace); ga = gravelly sand with clay and silt.

Qvoa 13ga — Very old (Pleistocene, older than 500,000 years) alluvial river deposit; moderately consolidated sediments. Age of river-cut platform is estimated to be 698,000 (13 = Clairement Terrace); ga = gravelly sand with clay and silt

Qvomt 12-15sa,ga — Very old (Pleistocene, older than 500,000 years) marine and non-marine terrace deposits above marine wave-cut platform; moderately consolidated sediments. Age of platform is estimated between 510,000 years (15 = San Elijo Terrace) and 800,000 years (12 = Tecolote Terrace); sa = silty sand with clay and gravel; ga = gravelly sand with clay and silt.

Tsm — San Mateo Formation. Marine coarse grained arkosic sandstone with conglomerate and conlomeratic sandstone lenses; weakly cemented and poorly bedded. Also known as the turbidite facies of the Capistrano Formation (Morton cs, 1976).

Tcs — Capistrano Formation Siltstone facies; marine siltstone, mudstone, silty and diatomacious shale, poorly to moderately consolidated and poorly bedded. With minor fine to medium grained sandstone lenses, weakly cemented and poorly bedded.

Tm — Monterey Formation. Marine diatomaceous shale interbedded with silty shale, siliceous shale and siltstone, with minor chert, limestone and clacareous shale lenses. Generally thin bedded, hard but severely fractured/jointed and fissile.

Tso — San Onofre Breccia. Marine breccia, conglomerate, fine to coarse grained sandstone, conglomeratic sandstone with sandy siltstone lenses and interbeds. Poorly cemented but locally well cemented; massive to poorly bedded to lenticular. The clasts mainly consist of Catalina Schist detritus.

Tsv — Sespe and Vaqueros formations. Undifferentiated; marine interbedded siltstone, mudstone and sandstone, and non-marine coarse grained sandstone, clayey and silty sandstone and conglomeratic sandstone. Poorly bedded; masive to thick bedded except minor thin-bedded siltstone. Poorly to moderately indurated.

Tsa — Santiago Formation. Marine sandstone, conglomeratic and silty to clayey sandstone with greenish-gray siltstone interbeds, locally conlomeratic near base. Moderate to well indurated; poorly bedded and massive to thickly cross bedded sandstone, locally well bedded fine grained sandsone.

Tsi — Silverado Formation. Lower beds: non-marine coarse grained sandstone with interbedded siltstone and basal conglomerate; local brownish pisolitic clay bed (Claymont) and whitish clay bed (Serrano), with minor carbonaceous shale and lignite. Upper beds: marine medium to fine grained sandstone, conglomerate, siltstone and shale. Poorly to well indurated, moderately to well bedded.

Kwp — William Formation. Pleasant Sandstone Member. Marine fine to medium grained sandstone, silty sandstone and siltstone; poorly cemented; thin-bedded siltstone, massive to thick-bedded sandstone.

Kws — Williams Formation. Schulz Ranch Member. Marine siltstone (lower beds) and conglomeratic sandstone (upper beds); poorly to moderately consolidated; moderately well bedded; massive to thin bedded.

Kt — Trabuco Formation. Non-marine fanglomerate with unsorted clasts, ranging from 3 inches to 3 feet in diameter; poorly indurated, deeply weathered; massive to poorly bedded.

REFERENCES

1. Blanc, R.P., and Cleveland, G.B., 1968, Natural slope stability as related to geology, San Clemente area, Orange and San Diego counties, California: California Department of Conservation, Division of Mines and Geology, Special Report 98, 19, p., Plate 1, 1:20,000.

2. Boss, R.F., and Olmsted, F.H., date unknown, Geologic field maps of parts of Camp Pendleton, San Diego County, California: U.S. Geological Survey, unpublished maps, 1:24,000.

3. Bowman, R.H., 1973, Soil Survey of the San Deigo area, U.S. Department of Agriculture, Soil Conservation Service, map sheet no. 1, 1:24,000.

4. Ehlig, P.L., and Farley, T., 1976, Geologic map adjacent to San Onofre Nuclear Generating Station: Southern California Edison Company, unpublished report, Figures 6 and 7, 1:6000.

5. Kern, J.P., 1996, Preliminary geologic map of Quaternary marine terraces of the San Clemente 7.5' quadrangle, Orange County, California: California Department of Conservation, Division of Mines and Geology, unpublished report, 2 plates, 1:24,000.

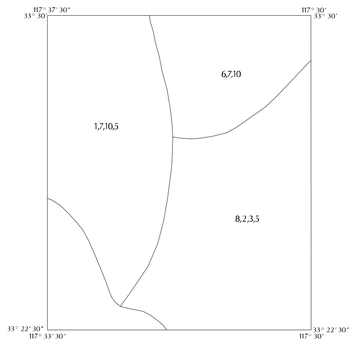
6. Morton, P.K., 1972, Reconnaissance geology of the north east portion of the San Clemente quadrangle, Orange County, California: California Department of Conservation, Division of Mines and Geology, unpublished map, 1:24,000.

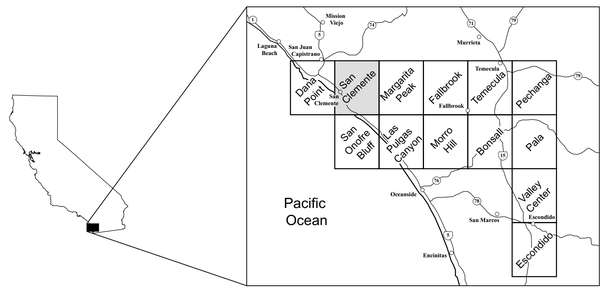
7. Morton, P.K., and Miller, R.V., and Evans, J.R., 1976, Environmental Geology of Orange County, California: California Department of Conservation, Division of Mines and Geology, Open File Report 79-3, 474 p., 6 plates, 1:48,000.

8. Moyle, W.R., Jr., 1973, Geologic map of western part of Camp Pendleton, southern California: U.S. Geological Survey Open File Map, 1:48,000.

9. Tan, S.S., and Weber, F.H., 1984, Inventory and analysis of recent damaging slope failures and debris flooding, southern coastal Orange County, California: California Department of Conservation, Division of Mines and Geology, Open File Report 84-27, 48 p.

10. Watchell, J.K., 1978, Soil survey of Orange County and western part of Riverside County, California: U.S. Department of Agriculture, Soil Conservation Service, 149 p., Map Sheet no. 20, 1:24,000.





Topographic base by U.S. Geological Survey
7.5' San Clemente Quadrangle
Polyconic projection, contour interval 20 feet, dotted lines 10 feet.

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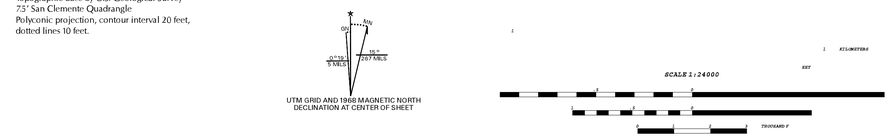

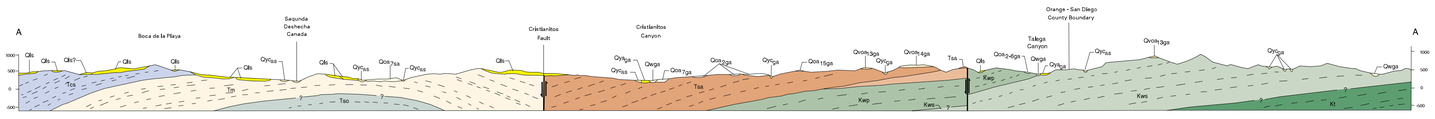

GEOLOGIC CROSS-SECTION
Scale: 1:24,000